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THE CANADIAN SPECIES OF TRIMEROTROPIS.

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As only three specimens of *Trimerotropis*, Stal, have been reported from Canada, and as the writer has taken several others, of which three seem to be undescribed, the present paper may be of some value as a preliminary notice of the Canadian species of this genus.

The following table will serve to distinguish the species of *Trimerotropis* known to occur in Canada. It is artificial, but as the species enumerated are few, the table will perhaps be of greater service than would a more natural one. In the notes following the table the species are arranged according to McNeill's recent "Revision of the Orthopteran Genus *Trimerotropis*," the new species being placed according to their nearest affinities.

Key to the Canadian Species of Trimerotropis.

A¹ Hind tibiae red, tegmina crossed by bands which may be conspicuous or faint on account of the slight contrast between them and the ground colour.

a¹ Disk of the metazone of the pronotum plainly lighter than the prozone. Bands of tegmina distinct, but formed by the segregation of numerous small spots..... 3. *monticola*, Sauss.

a² Disk of the metazone not distinctly lighter than the prozone.

b¹ Bands of the tegmina conspicuous, solid, and not formed by a segregation of small spots; process of the metazone acute..... 4. *Bruneri*, McNeill.

b² Bands of the tegmina inconspicuous, and made up of fuscous annuli; process of metazone obtuse..... 5. *citrina*, Scudd.

A² Hind tibiae never red.

a¹ Hind tibiae blue. Bands of tegmina conspicuous, but made up of fuscous spots. Fuscous band of the wing very narrow..... 2. ? *ceruleipes*, Scudd.

a² Hind tibiæ green or yellow. Bands of tegmina variable.

b¹ Lower sulcus of hind femora light, with two dark bands.

c¹ Tegmina long and narrow, the bands obsolete or represented by irregular groups of segregated spots. Hind tibiæ yellowish. Antennæ of male shorter than hind femora . . . 1. *maritima*, Harris.

c² Tegmina of ordinary length and width, the bands conspicuous, the basal and median being solid. Hind tibiæ green. Antennæ of male longer than hind femora 6. *longicornis*, n. sp.

b² Lower sulcus of hind femora black, with one preapical light band.

c¹ Spur of the fuscous band of the wing extending about half-way to the base. Tegmina either with distinct bands, or when this is not the case, not sprinkled throughout with fuscous annuli.

d¹ General colour light or dark brown, much varied with fuscous. Area of the cubital forks in ♀ occupied by several rows of cubical cells. Tegmina always crossed by well-defined bands. 7. *vinculata*, Scudd.

d² General colour ash-gray, varied with brown and white. Area of the cubital forks in both sexes occupied, at least in the basal part, by a single row of cubical cells. Tegmina variable; bands usually poorly developed, often entirely absent, but sometimes well defined 8. *huroniana*, n. sp.

c² Spur of the fuscous band of the wing extending very nearly to the base. Tegmina sprinkled with fuscous annuli, which show very little, if any, tendency to form bands. . . 8. *sordida*, n. sp.

1. *Trimerotropis maritima*, Harris.

Locusta maritima, Harris, Ins. Inj. to Veg., 1841, p. 178.

Oedipoda maritima, Scudd., Mat. Mon. N. A. Orth., 1862, p. 472.

Trimerotropis maritima, Stal, Recens. Orth., I., 1873, p. 135.

This species is found plentifully in Southern Ontario, along the shores of the great lakes, occurring in a form somewhat different from the typical one of the Atlantic Coast, and to which I have given the racial name, *interior* (CAN. ENT., XXX., 262).

McNeill's description of *maritima* in his recent Revision (p. 450) seems to have been based entirely upon specimens from the Atlantic Coast, and it does not fit *interior* in all respects. The width of the wing-band in the latter is often nearly one-fourth the length of the wing, whereas McNeill states that it is never as much as one-sixth; and the tegmina of *interior* often show distinct traces of three bands, which fact is also contrary to McNeill's description. Moreover, the measurements given are much too large for the race *interior*, although the latter is very variable in size. Accordingly, I give the following measurements taken from Ontario specimens:

Length of body, ♂ 19 to 22 mm., ♀ 26 to 30 mm.

Length of tegmen, ♂ 19 to 24 mm., ♀ 27 to 31 mm.

Length of hind femora, ♂ 11 to 12 mm., ♀ 13.5 to 15.5 mm.

I have specimens from the following localities: Toronto Id., July-Sept.; Rond Eau, Sept. 14, 1899; Point Pelee, Aug. 7, 1901; Kingsville, Aug. 13, 1897; Walpole Id., St. Clair River, Aug. 13, 1901; Southern extremity of Lake Huron, near Sarnia, Aug. 12 and 14, 1901.

2. *Trimerotropis* ?*cæruleipes*, Scudd.

Trimerotropis cæruleipes, Scudd., 2nd Rept. U. S. Ent. Com., App. 11, 1880, p. 27.

Mr. Scudder, to whom I sent a specimen of this insect for determination, replied that it was "apparently a new species near *cæruleipes*, or else that species, which is very variable," and remarked that he had a specimen like mine from Yellowstone Park. My specimens are from Discovery Id., near Victoria, B. C., Sept. 6, 1897; Nanaimo and Duncan's, Vancouver Id., Sept. 7, 1897. It is a very common insect on Vancouver Island, in both rocky and sandy districts. I found it in great numbers on Discovery Id., one of the numerous small islands near Victoria. Here it flew with a swift, low flight about the bare rocks in the more open places, the males producing a very rapid crepitation.

3. *Trimerotropis monticola*, Sauss.

Trimerotropis monticola, Sauss., Prodr. (Edip., 1884, p. 170.

This is the most abundant species of the genus on the dry plains of Assiniboia. It bears an extraordinarily close resemblance to one of the

commonest forms of *Spharagemon collare*, Scudd., which is met with in the same situations. It can be distinguished at once, however, by the two-notched median carina, the *Spharagemon* having but one.

I have specimens from Moose Jaw, Ass'a, Aug. 30, 1897; near Waldeck, Ass'a, Aug. 30, 1897; near Gull Lake, Ass'a, Aug. 30, 1897; Swift Current, Ass'a, Sept. 20, 1897; Morse, Ass'a, Sept. 20, 1897; Vernon, B. C., Sept. 10, 1897.

4. *Trimerotropis Bruneri*, McNeill.

Hadrotettix gracilis, Bruner, MSS.

Trimerotropis Bruneri, McNeill, Proc. U. S. Nat. Mus., XXIII, 1901, p. 423.

I have a single male of this species, taken at Swift Current, Ass'a, Sept. 20, 1897.

5. *Trimerotropis citrina*, Scudd.

Trimerotropis citrina, Scudd., Bull. U. S. Geol. Surv. Terr., II., 1876, p. 265.

I have seen no Canadian specimens of this form, but it has been reported by Scudder from Manitoba.

6. *Trimerotropis longicornis*, new species. (Pl. I., figs. 1-4.)

♂. Of medium size, dull grayish-brown, paler beneath. Head of average size, ash-gray below the ocellus, infuscated above. Face evenly but rather sparsely and indistinctly punctate throughout. Occiput considerably elevated above the pronotum, evenly convex, dark grayish-brown. Scutellum a little longer than broad, strongly sulcate, limited in front by a V-shaped depression. Median carina present, but faint. Lateral carina well marked, forming a very obtuse and somewhat rounded angle opposite the anterior margin of the eyes, from which they converge to meet the frontal costa. Lateral foveolæ triangular, rather large and shallow. Frontal costa failing by some distance to reach the clypeus, sulcate at and for a short distance below the ocellus, where it is slightly expanded; above the ocellus plane and evenly punctate. Lateral carinae of the face reaching the clypeus, but not prominent. Eyes moderately prominent, about as long as the genal groove. Antennæ surpassing the hind femora by about one-fourth the length of the latter. Pronotum dark grayish-brown, rather short. Greatest width of disk about seven-eighths of the length. Prozone somewhat elevated and tectiform, three-fifths as long as the metazone. Disk of metazone much lighter than the

prozone, being pale grayish-brown, finely granulose with a few small scattered black tubercles; process very slightly obtusangulate, the sides straight and the tip scarcely rounded. Median carina slightly cristate on the front part of the metazone, but gradually fading behind into a mere raised line, cristate and prominent on the prozone, and distinctly bilobate, the anterior lobe about twice as long as the posterior, the posterior notch much more prominent than the anterior. Lateral carinæ distinct only on the front part of the metazone. Tegmina of ordinary length and width. Area of cubital forks occupied by two or three rows of irregular cells. Markings of tegmina very like those of *T. vinculata*; inner third occupied by a solid dark brown band, with a well-defined unbroken margin, beyond which are two others of the same colour, a solid median band about half as wide as the basal, and a still narrower, somewhat irregular and broken band between the outer and middle thirds of the tegmen. These bands are separated by light brown bands of about the same width as the median band. Apical third semi-transparent, with a few scattered dark brown spots. Wings with the disk light yellow, apical portion infuscated at tip, the hyaline area rather limited in extent, and not definitely separated from the rather narrow fuscous band which crosses the wing slightly beyond the middle and does not reach the anal angle. Spur extending half way to the base. Hind femora externally grayish-brown, with a pale yellow preapical annulus and crossed by two dark brown, not very well defined, bands; internally the disk, inner, and upper sulci, are light yellow, crossed by two black bands. Hind tibiæ light green, with a pale yellowish sub-basal annulus.

Length of body, 21 mm.; length of antennæ, 14.5 mm.; length of head and pronotum, 7 mm.; length of tegmen, 22 mm.; length of hind femora, 11.5 mm.

Described from one male, Vernon, B.C., Sept. 10, 1897. I have another specimen, also a male, taken on the same date at the same locality, which I feel pretty sure belongs to this species, but differs so much in the character of the wing-band and in several less important points that I have hesitated to place them together. In this specimen the width of the fuscous band in its widest part is equal to fully one-fourth the length of the wing, it crosses the middle of the wing in the usual way, its outer margin is well defined, and the apical portion of the wing is hyaline, with only the slightest trace of infuscation at the apex. The antennæ are

somewhat shorter, but are still longer than the hind femora, the pronotum slightly longer, the greatest width of the disk being about four-fifths the length. All these points, with the exception of the character of the wing-band, might easily be due to individual variations, and in all other respects the specimens agree closely, so that the species is probably very variable in the markings of the wings.

T. longicornis seems to approach *T. salina*, Bruner, but I have not seen the latter species.

7. *Trimerotropis vinculata*, Scudd. (Pl. I., figs. 5-7.)

Trimerotropis vinculata, Scudd., Ent. Notes, V., 1875-76, p. 25.

Trimerotropis cincta, Sauss., Prodr. Edip., 1884, p. 171.

I have specimens of this species from Agassiz, B. C., Sept. 9, 1897; Vernon, B. C., Sept. 10, 1897; Revelstoke, B. C., Sept. 19, 1897. I found it very common at Vernon in dry, open places, but at each of the other localities I took but a single specimen.

It has also been reported by Dr. Fletcher from Victoria, B. C. (Rep. Exp. Farms Can., 1888, 63).

8. *Trimerotropis huroniana*, new species. (Pl. I., figs. 8-13.)

Of medium or rather small size; pale ashy gray, varied with brown and white; in its general colour and maculation much resembling *T. maritima*, race *interior*.

Head of the ordinary size, pale ash-gray or nearly white, faintly mottled with darker gray. Occiput considerably (♂), very slightly (♀), elevated above the level of the pronotum, nearly smooth; brownish fuscous, with paler grayish mottlings, especially externally, where they form a pale postocular band continuous along the margin of the disk of the pronotum, with a more or less distinct band of the same colour. Below this pale band there is more or less indication of a grayish fuscous postocular band, more distinctly defined above than below, where it merges into the grayish mottlings of the genæ. Scutellum longer than broad (♂), about as long as broad (♀), strongly sulcate, limited in front by a V-shaped depression; median carina usually distinct, especially anteriorly, sometimes nearly obsolete. Lateral carinæ sharp, lighter in colour than the disk, extending and slightly diverging from a point opposite the middle of the eye to the front margin of the eye, where they form a marked angle, and whence they converge, keeping a fairly straight course, to meet the frontal costa. Lateral foveolæ rather small, triangular, moderately deep. Frontal

costa deeply sulcate throughout, considerably expanded at the ocellus, above and below which it is constricted, the sides below the lower constriction diverging as they approach the clypeus, which they fail to reach. Lateral carinæ of the face moderately prominent, reaching the clypeus, but less marked in the upper than in the lower portion. Eyes moderately prominent, as long as the genal groove (♂), distinctly shorter (♀). Antennæ about four-fifths (♂) or five-sevenths (♀) as long as the hind femora, grayish brown, slightly darker apically. Pronotum expanding moderately on the metazone, posterior margin rectangulate, the angle but little rounded. Greatest width of disk about four-fifths (♂) or five-sixths (♀) of the length. Prozone not more than half as long as the densely-punctate metazone; the latter gently convex antero-posteriorly and very broadly convex transversely. Median carina a raised line on the metazone, feebly cristate on the prozone, the anterior lobe nearly twice as long as the posterior, the notches, especially the anterior, rather shallow. Lateral carinæ distinct only on the anterior part of the metazone. Sides of the pronotum with two whitish spots, the upper extending across the whole of the prozone, the lower between the two posterior sulci. A dark brown spot separates these, and extends to the anterior margin of the prozone. Tegmina rather long, but of average width, quite like those of *T. vinculata* in form, extremely variable in markings, sometimes being as strongly banded as average specimens of *vinculata*, sometimes perfectly immaculate, with an ill-defined clouding of the basal fourth. Ground colour ashy or light brownish gray, in average specimens with distinct indications of bands, a basal one occupying the basal third or fourth, and a median band generally represented by an irregular but fairly solid spot. Apical third semitransparent, often immaculate, but generally with a variable number of scattered spots, which only in very distinctly marked specimens form any semblance of a band. Wings very similar to those of *vinculata*, slightly less than twice as long as broad. Disk very pale yellow. Fuscous band nearly equal, with both inner and outer margins arcuate; width about one-sixth, or a little more, the length of the wing; the spur extending about half way to the base. Apical portion of wing hyaline, immaculate; many of the veins whitish. Outer face of hind femora very light gray, with a pale yellowish preapical band, and with more or less distinct indications of a basal transverse fuscous band, and median and post-median oblique bands, these bands being generally well

marked in the ♂, but often indistinct in the ♀. Disk of the inner face black, with two light bands, a median and a preapical; the upper sulcus with an additional light band near the base; lower sulcus black, with one preapical light band. Hind tibiae pale yellow.

Length of body, ♂ 20 mm., ♀ 27 mm.

“ “ antenna, ♂ 10 mm., ♀ 9.5 mm.

“ “ head and pronotum, ♂ 7 mm., ♀ 8.5 mm.

“ “ tegmen, ♂ 22 mm., ♀ 27 mm.

“ “ hind femora, ♂ 11 mm., ♀ 13 mm.

Described from twenty-one ♂♂, fifteen ♀♀, Southampton, Ont. Aug. 20, 21 and 29, 1901.

This species is closely allied to *T. vinculata* and *T. saxatilis*, McNeill, but I am satisfied that it is distinct from both. Mr. Scudder, to whom I sent a pair, gave his opinion that they agreed slightly better with McNeill's description of *saxatilis* than with *vinculata*, but was unable to decide whether it should be referred to the former or not. I tried to obtain specimens of *saxatilis* for comparison, but was unsuccessful. Nevertheless, after comparing my series with McNeill's rather brief description of *saxatilis*, I find that there are points of difference that seem to be constant. These are as follows:

In *saxatilis* the metazone of the pronotum is not more than one and three-quarter times as long as the prozone; in *huroniana* it is in every specimen in my series fully twice as long as the prozone, and sometimes slightly more. In *saxatilis* the tegmina, though variable, are usually very strongly varied with fuscous, and when nearly plain it is by the suffusion of the ground colour with fuscous. In *huroniana* the tegmina are only occasionally strongly varied with fuscous, and when plain it is not through suffusion, but merely from absence of the bands; in other words, it is the darker specimens of *saxatilis* that have plain tegmina, whereas it is the lighter specimens of *huroniana*. The wings in *saxatilis* are relatively shorter than in *vinculata*, being considerably less than twice as long as broad. In *huroniana*, on the other hand, they are identical in form with those of *vinculata*, and the wing-band is as narrow as in that species, whereas it is broader in *saxatilis*.

It may also be mentioned that *saxatilis* in Arkansas is found only on rocky ground, whereas *huroniana* avoids rocks, being like *T. maritima*, partial to the sandy beaches, close to the water's edge.

From *vinculata*, besides differing in colour and markings, *huroniana* has a more deeply sulcate frontal costa, never being plane above the ocellus, and the area of the cubital forks of the wings is narrower, containing even in the ♀ but a single row of cubical cells in at least the basal portion.

This species is particularly interesting, as it seems to replace *T. maritima* on the northern part of the east shore of Lake Huron. In the vicinity of Southampton there is a limited extent of wide, sandy beach, north of which the shore is continuously rocky. On this beach *huroniana* is to be found under very similar but more boreal conditions to those under which *maritima* is found further south.

In flight it is extremely alert, and its stridulation is peculiar, being a very rapid but not loud crepitation, interrupted about thrice in a second, so that at a little distance it seems to be composed of separate notes. Usually three, sometimes four of these, are produced at a time.

9. *Trimerotropis sordida*, new species. (Pl. I., figs. 14-18.)

Of medium or rather small size, uniform dull pale grayish-brown, showing very little contrast in the markings of the body and tegmina. Head light brownish, more or less faintly mottled and punctate with a darker and more grayish colour. Occiput barely or not at all elevated above the pronotum, somewhat roughened, slightly darker than the face. Scutellum fully as broad as long, strongly sulcate; the median carina usually distinct for some distance backwards on the occiput, and limited in front by a slight V-shaped ridge, in front of which is a more or less marked depression. Lateral carinæ prominent and sharp, diverging to a point opposite the front margin of the eyes, where they form a marked angle, thence converging in a distinctly incurved course to meet the frontal costa. Lateral foveolæ large, subtriangular, moderately depressed. Frontal costa very strongly sulcate throughout, constricted above and below the ocellus; the sides below the lower constriction gently diverging until they meet the clypeus. Lateral carinæ of the face reaching the clypeus, strongly bent, very prominent and equally so throughout. Eyes moderately prominent, but not large, being even in the ♂ distinctly shorter than the genal groove. Antennæ about four-fifths (♂) or three-quarters (♀) as long as the hind femora, grayish-brown, darker apically. Pronotum of ordinary length, moderately expanded on the metazone. Process of metazone rectangular or slightly acutangulate, sides straight, angle scarcely rounded. Greatest

width of disk four-fifths (σ), eight- or nine-tenths (φ), the length. Prozone considerably contracted, with the disk rather more than ordinarily wrinkled, as long as or slightly shorter than half the length of the somewhat coarsely granulated metazone, the latter slightly convex both antero-posteriorly and transversely. Median carina prominent throughout, strongly cristate and bilobate on the prozone, the posterior notch especially deep and somewhat oblique; cristate on the anterior part of the metazone. Lateral carinae very sharp and prominent on the metazone, continued forward a short distance on the posterior part of the prozone. They are also present to a variable extent on the anterior part of the prozone. Tegmina rather long, of moderate width, pale dull brownish, sprinkled throughout with grayish fuscous annuli, which form a more or less distinct group occupying the basal third or fourth, and also show a tendency to collect in the middle of the tegmen, but do not form anything that could be called a band. Area of the cubital forks rather narrow, usually occupied by two or three rows of irregular cells, or, as in one σ which I have, by a single row of cubical cells. Wings fully three-fifths as wide as long; disk pale yellow; fuscous band crossing about the middle of the wing not reaching the anal angle, the outer margin less curved than the inner, so that the band is considerably wider where it meets the outer margin of the wing than it is at the costal margin. Greatest width of band varying from one-fourth to slightly more than one-third the length of the wing. Spur extending very nearly to the base. Apical portion of the wing hyaline, with a few fuscous spots near the apex in the σ , none of the veins whitish. Outer face of the hind femora plain grayish-brown, or with faint indications of darker bands; inner face black, with two light bands, a median and a preapical, the upper sulcus with an additional light band near the base; lower sulcus black, with one preapical light band. Hind tibiae pale yellowish, slightly darkened apically.

Length of body, σ 20 mm., φ 23 to 28 mm.

“ “ antennae, σ 8.5 to 9 mm., φ 9 mm.

“ “ head and pronotum, σ 7 to 7.2 mm., φ 7.8 to 8.3 mm.

“ “ tegmen, σ 21.5 to 22 mm., φ 24 to 26.5 mm.

“ “ hind femora, σ 10.2 to 11 mm., φ 11.5 to 12.2 mm.

Described from 3 σ σ and 2 φ φ . Moose Jaw, Ass'a, Aug. 30, 1897, 1 σ , 1 φ ; Waldeck, Ass'a, Aug. 30, 1897, 1 σ ; Morse, Ass'a, Sept. 20, 1897, 1 σ , 1 φ .

This species is found on the semi-arid plains of Assiniboia. Its flight is higher and slower than that of any other *Trimerotropis* I am acquainted with, resembling that of *Circotettix*, as does also the stridulation to some extent, which, however, is no louder than that of most species of its genus.

In conclusion, I wish to express my sincere thanks to Mr. Scudder for his valuable assistance in determining the material upon which this paper is based.

EXPLANATION OF PLATE I.

Fig. 1, *Trimerotropis longicornis*, ♂, pronotum.

" 2,	"	"	♂, face, front view.
" 3,	"	"	♂, head and pronotum, from above.
" 4,	"	"	♂, tegmen and wing.
" 5,	"	<i>vinculata</i> ,	♂, pronotum.
" 6,	"	"	♂, face.
" 7,	"	"	♀, tegmen and wing.
" 8,	"	<i>huroniana</i> ,	♂, pronotum.
" 9,	"	"	♂, face.
" 10,	"	"	♀, tegmen.
" 11,	"	"	♀, tegmen.
" 12,	"	"	♀, tegmen and wing.
" 13,	"	"	♀, lateral view.
" 14,	"	<i>sordida</i> ,	♂, pronotum.
" 15,	"	"	♂, face.
" 16,	"	"	♂, head and pronotum.
" 17,	"	"	♂, tegmen and wing.
" 18,	"	"	♀, lateral view.

EULECANIUM LYMANI.

SIR,—Permit me to correct a slight error into which Mr. King has fallen in regard to the locality where I found the scales of *Eulecanium Lymani*, as the tree was not, as stated, at Quebec, but at St. Hilare, a station on the line of the Grand Trunk Railway, about twenty-two miles east of Montreal. I shall be happy to send specimens of this scale to anyone interested in scale insects.

H. H. LYMAN.